

NOTES ON CERTAIN BIRDS OF PARADISE*

BY LEE S. CRANDALL

Curator of Birds, New York Zoological Park

The following notes represent a rather miscellaneous collection of personal observations on various birds of paradise living in the New York Zoological Park. No attempt has been made to present complete accounts of the species mentioned. Some of these birds were collected by the New York Zoological Society's expedition to New Guinea¹ in 1928-9, in which Mr. J. E. Ward and the writer participated. Others have been gathered from various sources, usually through dealers, so that, beyond the known range of the form in question, there is no means of determining exact localities.

PRINCE RUDOLPH'S BLUE BIRD OF PARADISE

Paradisornis rudolfi Finsch

My notes on the curious, inverted display of the male of this species have already been printed.² Displays by female birds of paradise, while unusual, are not unknown and I have the following description of such a display by a female blue bird of paradise, made on March 19, 1923. The sex of this bird was later confirmed by post-mortem examination.

Hanging upside-down from top of cage, legs fully extended. Wings slightly spread, breast feathers expanded laterally, just projecting beyond wings, and turned slightly forward. Tail pressed forward, between legs, until nearly horizontal. Head not turned upward as high as cock's in display, and eyes not closed. Vibrated backward and forward from hips, like the cock, and also occasionally drew her body upward to horizontal position. Also vibrated rapidly up and down, bending leg joints. Very persistent and almost impossible to disturb, although not ordinarily a particularly tame bird.

In general, this display of the female is similar to that of the male, but there are several striking differences. I have never seen

* Submitted for publication, November 16, 1932. To press December 3, 1932.

¹ New York Zoological Society Bulletin, Vol. XXXII, No. 6.

² New York Zoological Society Bulletin, Vol. XXIV, No. 5, pp. 111-113, also "Paradise Quest" (1931) pp. 107-108.

a male move his tail into the horizontal position, or "vibrate up and down." During display, the male sings constantly, in a low, grating voice; the female was silent. I saw this female in action only once but she was observed on another occasion by a keeper. Neither of the females now in the collection has so far been seen to attempt display.

There is much confusion concerning the natural molting periods of the birds of paradise; no doubt differences in altitude, humidity and temperature account largely for conflicting statements. Blue birds of paradise taken at Deva-deva, Central Division, Papua, in October, 1928, were all in full plumage, with no indication of molt. These captive birds began dropping feathers in January, continuing the process of feather renewal normally. Once they have become established in New York, however, all birds of paradise that I have been able to observe begin the molt in spring or early summer. In some species, there appears to be a tendency to begin somewhat later in consecutive years, but there is not yet sufficient data on this point. I have the following dates for approximate beginning and completion of molt in an individual male blue bird of paradise:

Molt began June 16, 1930, completed October 14, 1930

“ “ July 7, 1931, “ November 9, 1931

“ “ July 1, 1932, “ November 8, 1932

These figures indicate a continuous molting period of approximately four months, which is confirmed by observations on two other males of the same species, during single years. The period of full courtship display coincides, naturally, with completion of the molt but display may take place even at the height of the molting period, when the bird is in very ragged condition. Presence or absence of the female appears to have little if any bearing on frequency of display.

RED BIRD OF PARADISE

Uranornis rubra (Daudin)

I have never seen the display of this species. I have the molting period of an immature male now living in the collection: May 3, 1932 to August 10, 1932. This span of about three months corresponds to what seems to be normal here, for females and plumeless males of *Paradisaea*.

EMPEROR OF GERMANY'S BIRD OF PARADISE

Paradisaea guilelmi Cabanis

Two adult males of this species, purchased in London, arrived here on November 18, 1931. One commenced molting about December 10, 1931 and finished about April 20, 1932. The other was first noticed dropping feathers on December 17, 1931 and was in full plumage about April 30, 1932. This period of roughly four months is normal for plumed males of *Paradisaea*, as observed here.

This bird has at least two types of call-note. One resembles the usual call of *Paradisaea* males, very loud and piercing, in volume somewhere between *apoda* and *minor*, and delivered with the mouth wide open. The other is quite different from anything I have heard before. The bird draws himself erect, expanding the strikingly large green patch on the throat and breast. He then emits a soft, clear, *poop, poop, poop!*, throwing his head upward with each note and keeping the bill almost closed.

No signs of attempted display were seen until October 16, 1932. On this occasion, the bird was moving along a perch, then hopping to another, his body in a stiffly horizontal position, head and neck extended, beak turned down. He was "bobbing" slowly up and down, from the hips. He then spread the wings in the horizontal plane, and vibrated them very rapidly. The flank plumes were slightly spread vertically, and raised somewhat above the line of the back. This continued at intervals for about ten minutes.

On October 25, the same bird was seen giving the loud call, then "bobbing" along his perches as described above. He then called again, four times, and leaped to his favorite perch. His body became rigid, in the horizontal position, the head and neck extended forward and slightly down. The flank plumes were held as described above. The wings were suddenly spread and flicked forward, so that the upper surfaces were toward the bird's head. This pose was held for about five seconds, when the wings were snapped back into normal position. After being held there for another five seconds, they were again thrown forward. The bird repeated this flicking movement seven times, at about the same intervals, then threw up his head, called loudly and began moving about his perches.

On the morning of October 27, at about nine o'clock, the full display was seen for the first time. The bird went through the

“bobbing” and “flicking” phases of his display several times. Suddenly he called loudly, and turned head first under his perch, which he clutched firmly. The body was drawn up quite close to the perch, in a position nearly horizontal, but with the anterior portion somewhat lower than the posterior. The wings were fully spread and turned well up. The tail, also, was widely spread and turned nearly vertical, so that the long wires extended far above. The head and neck were fully extended and turned upward. The plumes were erected at an angle of about 45° , those at each side forming a semicircle, overlapping anteriorly and posteriorly to make a complete circle around the inverted abdomen. Each plume now appeared as a separate entity, the widely-spaced barbs being seen to great advantage. Head, wings and tail remained outside the circle, which enclosed only the feet, as they grasped the perch. The body was then moved slowly from side to side, with a slight rotary motion, causing the plumes to wave gracefully but not disturbing the general formation. The display lasted for about five minutes, during which the head, wings and tail were held rigidly in position. The bird made no sound during the period, at the end of which he returned head first to normal position. After an interval of about ten minutes, devoted to calling loudly and leaping with animation from perch to perch, he repeated the entire performance, including “bobbing,” “wing-flicking” and the inverted climax.

COUNT RAGGI'S BIRD OF PARADISE

Paradisaea apoda raggiana Sclater

The courtship display of this species is too well known to be described here. I have, however, a few notes on the molting period. A single adult male is recorded as beginning to drop feathers on the following dates: June 1, 1918; May 21, 1921; May 16, 1922; May 1, 1923. No notes of finishing dates were kept. Adult birds of each sex, taken at Deva-deva in October, 1928, were in full plumage. Of these, an adult male began his molt, while at sea, on February 26, 1929; he was in full plumage on July 1, approximately four months later. In 1930, he began on May 8, and was complete on September 20. In 1931, the dates were May 3 and September 10; in 1932, May 12 and September 21. The only dates I have for a female of this species are from April 20 to July 18, which is the normal expectation.

LORD ROTHSCHILD'S GORGETTED BIRD OF PARADISE

Astrapia rothschildi Foerster

Two adult males and a supposed female of this species were received from London on November 18, 1931. As soon as they had been placed in flight cages, it was noticed that the wings of the male make a distinctly audible rustling sound when in motion.

One of the males began molting about January 1, 1932, and was finished about May 1. The second bird started about January 15, and had completed the change by May 30. On May 17, 1932, the first of these males was seen for the first time in a phase of display. He stood erect on the perch, his tail pushed forward beyond the perpendicular and slightly spread. The dark blue gorget or breast plate was widely spread and flattened, its fiery golden margin glowing conspicuously. The green feathers of the breast were also expanded laterally. The bird remained rigidly in this position for about ten seconds, making no sound. A few days later, the same phase was seen, except that on this occasion the bird rapidly opened and closed the lateral tail feathers.

This form of display was seen almost daily until August 26, 1932, when a more complicated development was observed for the first time. The bird turned backward under the perch, at right angles to it, the body nearly horizontal, but the anterior portion slightly lower than the posterior. The head and neck were turned upward at one extremity, the tail at the other, so that the bird formed an approximate semicircle. The gorget and the feathers of the abdomen were widely spread, as before, the gold margin of the former being very conspicuous. The ear coverts were spread upward around the head, joining the elevated ruff on the nape. The wings were pressed tightly against the body, and the feathers of the back were expanded so as to partly cover them. The tail was held upright and widely expanded at first, then the lateral feathers were rapidly opened and closed, the middle pair remaining stationary. The display was enacted four times, at intervals of from four to five minutes, each period lasting from ten to fifteen seconds.

At no time during display was any sound heard. This species is strangely quiet, and the only note it has been heard to utter here is an occasional thin, jay-like *kak, kak, kak, kak!* which seems to function as either call or alarm note.

LONG-TAILED BIRD OF PARADISE

Epimachus meyeri meyeri Finsch

An immature male and a female, apparently adult, of this form, were collected at Deva-deva, Central Division, Papua, in October, 1928 and landed in New York on March 29, 1929. The male appeared very young and we took him to be a bird of the year but this could not be definitely established. While still in immature plumage, he frequently gave a loud, rattling sound, reminiscent of the beginning of the call of the giant kingfisher or laughing jackass (*Dacelo novaeguineae*). In calling, the body was extended horizontally, with the mouth open. Violent paroxysms shook the bird, as the sound was literally shaken out. The female uttered only a single, plaintive yelp, which was given by the male also, when hungry or separated from the female. The alarm note is a deep, guttural grunt, delivered by both sexes, with rapid jerking of wings and body. These notes were continued when the birds were fully adult.

Both birds were in molt when landed in New York, but no notes of dates were made. Both were noted as dropping feathers on March 15, 1930 and both were recorded as completely finished on June 15, 1930. The tail of the male now appeared to be slightly longer and his general color somewhat darker than that of the female. He was also, by now, distinctly larger than his mate but aside from these points, the sexes were similar.

On April 5, 1931, both birds again began the molt. The female was finished by July 10 but this time the male required a longer period. On May 15, it was noticed that black feathers were appearing in rump, wing coverts and thighs. By June 15, the lower back, upper tail coverts, nape and the inner secondary on each side were black. A gray patch had appeared in the center of the breast and the two middle tail feathers, now black, had reached a length of about four inches. On September 10, the change was recorded as complete, including the flank plumes and the long pectoral shields. The tips of the middle tail feathers had become damaged, so that no measurement could be made. The change from immature plumage to the magnificent dress of the adult male had required a period of approximately five months.

In 1932, the male began dropping feathers on May 10, and was in full plumage by October 3, so that the period was again about five months.

Two forms of display were noted in the immature male. The most common was seen for the first time on September 13, 1929. The bird gave his rattling call, then turned his body so that his breast was directed upward, his feet retaining their original position on the perch. The breast feathers were spread as widely as possible (which is not very much in the immature bird), lapping over the tightly closed wings. The tail was partly spread. This position was held stiffly for about ten seconds; the bird then moved rapidly about the cage, returned to the original spot and repeated the display. When not in molt, the bird went through this performance many times daily. Usually, the bill was kept closed; very rarely, it was widely opened, displaying the bright yellow lining of the mouth. Once only, I noted that the lateral tail feathers were vibrating rapidly.

On a single occasion, a quite different form of display was seen, while the bird was still in immature plumage. It has never been noted since. The bird was in an upright position, with the breast feathers spread. The tail was jerked wide open, then tightly shut, the alternation being very rapid. The wings, which were closed against the body, were moved up and down along its sides, the upward movements coinciding with the opening of the tail. The display was continued for a minute or more so that, fortunately, I had opportunity to observe it fully.

After the male had assumed adult plumage, he was first seen in display on October 14, 1931. It was the common inverted form, most used by the immature bird, but now become more complicated. Standing normally on the perch, the bird expanded the feathers of the breast, taking some time to arrange the short decorative flank plumes, which extended outward, forming a fringe around the sides. He then gave his rattling call and turned the breast upward, his feet retaining their original position. The breast feathers were now spread to their fullest extent, the bird's body appearing flattened. The short feathers of the upper breast turned upward about the head, circling the throat so closely that the iridescent black of face and throat became very conspicuous. The wings were closely folded and the tail was slightly spread, though not vibrating or moving. The beak was closed. The long pectoral shields were folded beneath the plumage, so that they were entirely invisible. (They take no part in this form of display.) As in the immature stage, this pose

was held rigidly for about ten seconds, when the bird returned to normal position.

Later on, a second form of display was used by the adult bird, quite different from anything that had been seen before. In this phase, the bird sits in a normal position, ostensibly preening the loosely extended breast feathers and pectoral shields. Suddenly, without calling, the body is drawn erect, with tail very slightly opened, wings tightly closed. The breast feathers, encircled by the decorative flank plumes, are widely spread. The pectoral shields are thrown straight upward, so that they extend far above the head, wrapping it closely. At the upper extremity, the shields are narrow and compressed; at their bases, they broaden gradually, to pick up the line of the spread breast feathers. The beak is widely opened, to show the bright yellow lining of the mouth. This position is usually held rigidly for about five seconds, when the bird resumes his alternate preening and displaying.

On rare occasions, usually very late in the evening, a further development of this display has been seen. Stiffly maintaining the upright position just described, and with the feet firmly grasping the perch, the bird rotates his body in a series of short jerks, pausing for several seconds at the end of each, until it is at right angles with the axis of the perch. He then jerks slowly in the opposite direction, until he has again come to a right angle with the perch but is facing the other way. This movement may be continued for from two to five minutes. Throughout, the bird is obviously exerting himself to the utmost to maintain his tense attitude. There is no movement of tail, wings or plumes, and no sound, once the position has been struck.

LESSER SUPERB BIRD OF PARADISE

Lophorina superba minor Ramsay

I think I can add nothing to what is already known of the display of this bird. In addition to the rather harsh *ka-a, ka-a, ka-a*, which is given by the male in calling and displaying, both sexes use a series of rather sharp thin notes, rapidly repeated, when alarmed. This call is also used in the evening, at perching time, the sexes joining in chorus. At such times, it is noticeable that the voice of the female is distinctly higher and thinner than that of her mate.

Many species of this group cannot be kept in pairs in small quarters but male and female of this form agree well together. They frequently indulge in "tickling," the sexes alternating in working through the head and neck feathers of the companion. I have not noticed this habit in any other bird of paradise.

Most birds of this species collected at Deva-deva, in October, 1928, showed no signs of molt but I have notes of two males, one adult and one just coming into color, that were molting heavily at that time. A young male taken at this time was in the typical intermediate plumage resembling that of the female but interspersed with patches of black. About April 1, 1929, this bird began the molt and by September 1 was in full adult plumage, including full cape and breast-plate. Beyond the facts that full color was assumed in a single molt, after the intermediate stage, and that the time required was about five months, nothing of unusual interest was noted. A female beginning at the same time (April 1) was finished about July 1, establishing uniformity with the molting period of the females of all species noted.

On April 5, 1930, the male noted above was again in molt, beginning with the dropping of the cape feathers of the back, and the tips of the green breast-plate. Because of suspicion of some peculiarity, the bird was caught and examined on July 5. The body feathers had completed their growth and those of wing and tail were just finishing. Observation had shown that the iridescent feathers of the crown and the center of the breast-plate had not been dropped. On the nape, the space from which the cape was to grow, was completely bare. At each end of the breast-plate, was another bare space. The plate was represented only by the small central feathers, the whole being about one and one-half inches across. About August 1, the feathers of the crown and central breast-plate, began to drop, new ones beginning to grow immediately. The bare patches previously noted were still present. On August 15, it was seen that these spaces were filled with heavy blood quills. These grew very rapidly, so that by September 10, the entire molt was considered to be complete.

In 1931, the molt of this bird began about May 7 and was completed by October 5; in 1932, the dates were May 28 and October 24, the periods again being approximately five months for the third and fourth successive molts. The same delay in renewal of the ornamental plumage was noted, as in 1930.

In a fully colored male, taken at Deva-deva in October, 1928, and showing no sign of molt at that time, the cape and tips of the breast-plate were missing, and the spaces they should have occupied were bare. This bird died before new growth began but the instance seems to confirm the delayed renewal as normal for the species.

LAWES' SIX-PLUMED BIRD OF PARADISE

Parotia lawesi lawesi Ramsay

and

GREATER SIX-PLUMED BIRD OF PARADISE

Parotia sefilata (Pennant)

I have been able to note no difference in the display forms of these two birds; I have already given a description of the dance of the former.³

The only sound I have heard made by males of *Parotia sefilata*, is a harsh squawk, usually a single note but sometimes repeated so rapidly that, except in quality, it somewhat resembles the full call of *Paradisaea*. *Parotia l. lawesi* uses the same note, though somewhat softer. The latter also makes a soft, trilling sound, *treet, treet, treet*, rapidly repeated and with a rising inflection, more commonly heard at perching time.

My only record of the molting period of *Parotia sefilata* is one for an adult male, the period running from May 5, 1930 to September 6, approximately four months. There are two for a male of *P. l. lawesi*: April 21, 1930 to August 18, and April 8, 1931 to August 1. Each is roughly four months. I have no data for females. Birds of each sex taken at Deva-deva in October, 1928, showed no indication of molt.

STOMACH CASTS.

On several occasions, pellets of matted food detritus, cast by the lesser superb bird of paradise, have been observed. This regurgitation has not been noted in other species, though it may occur. These pellets had no covering and did not appear to differ from those commonly ejected by other passerine birds.

³ "Paradise Quest" p. 99.

Casts of another nature have been recovered in several species, as follows: *Paradisaea apoda raggiana*, June 24, 1929, and two more from the same bird within the next few weeks; *Parotia lawesi lawesi*, December 1, 1930, January 3, 1931 and April 6, 1932; *Lophorina superba minor*, January 2, 1931. All cases cited are of adult males. These casts were in the form of sacs, sometimes containing food detritus but usually empty. Their shape, size and heavily corrugated folds led to the supposition that they were formed by a shedding of the inner lining of the gizzard. Histological examination by Dr. Charles V. Noback, Veterinarian of the Zoological Park staff, confirmed this opinion.

In most cases, the casts were dry and shriveled when found. In two instances, they were recovered almost immediately after regurgitation. One of these, from *Paradisaea apoda raggiana* measured 30 x 16 x 7 mm; the other, from *Lophorina superba minor*, measured 19 x 15 x 9 mm. Both were quite empty.